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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/841,061	04/24/2001	Ilya Emil Berchenko	5659-06300/EBM	4091

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[REDACTED] ART UNIT      [REDACTED] PAPER NUMBER

3673

DATE MAILED: 06/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/841,061	BERCHENKO ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	John Kreck	3673

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 07 April 2003.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 2424-2426, 2430-2449, 2457, 2458, 2460, 2461 and 5150-5205 is/are pending in the application.

4a) Of the above claim(s) 5161-5163, 5184-5190 and 5193 is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 2424-2426, 2430, 2431, 2433-2449, 2457, 2458, 2460, 2461, 5150-5155, 5157-5205 is/are rejected.

7) Claim(s) 2432 and 5156 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
 If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)  The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

1)  Notice of References Cited (PTO-892)

2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) 23,25

4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

5)  Notice of Informal Patent Application (PTO-152)

6)  Other:

**DETAILED ACTION**

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/7/03 has been entered.

Claims 2424-2426, 2430-2449, 2457, 2458, 2460, 2461, and 5150-5205 are pending in this application.

Claims 5161-5163, 5184-5190, and 5193 remain withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 13.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2435, 5151, 5152, 5156, 5157, 5198, and 5199 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The use of the terms "part of"; "portion of"; and "portion of the part of" is not clear in these claims.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 2424-2426, 2433-2438, 2442-2447, 2457, 2458, 2460, 5150-5153, 5154-5163, 5167-5172, 5176-5181, 5184-5194, 5196-5200, 5102, 5204, and 5205 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. (U.S. Patent number 4,299,285) in view of Van Meurs, et al. (U.S. Patent number 4,886,118).

The Tsai reference teaches a method for treating a coal formation in situ comprising providing heat from one or more heaters to at least a portion of the formation; allowing the heat to transfer from the one or more heaters to a selected section of the formation; and producing a mixture from the formation through one or more production wells, wherein the heating is controlled such that the mixture is produced as a vapor. The Tsai reference fails to teach the at least about 7 heaters for each production well. Note that Tsai teaches: "*the principles are applicable to a multiple of interrelated injection and production wells*" (col. 2, line 8).

The Van Meurs reference teaches a similar in situ heating system, and further teaches that six or twelve heat sources for each production well significantly increases the production (col. 8, line 24).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the Tsai method to have included at least about 7 heaters disposed in the formation for each production well, as called for in claims 2424, 5154, and 5196, in order to improve production.

With regards to claim 2425, 5159; the Tsai and Van Meurs references fail to explicitly teach the superposition of heat sources. It is apparent that one of ordinary skill in the art would know that the heat sources should be spaced to substantially heat the entire formation. Any configuration of heat sources that provides heat to the entire formation would inherently cause superposition of heat; thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included superposition of heat as called for in claim 2425 and 5159; in order to ensure that the entire formation is heated.

With regards to claim 2426, 5160; the Tsai reference teaches temperature within the range of 270-400°C (300 or 350° are disclosed in col. 3, lines 42-45).

With regards to claim 2433, 5167, 5205; Tsai fails to teach a heating rate, but Van Meurs teaches the heating rate less than 10°C/day. It would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have a heating rate less than 10°C/day as called for in claims 2433,

5167, 5205; in order to efficiently heat the formation. The Pwr equation is a well known heat transfer law, and thus is inherent.

With regards to claim 2434 and 5168; the Tsai reference does not explicitly teach the transferring by conduction; however this is inherent in a solid substance such as coal. Even though the bulk of the heating in the Tsai method may be done by convection; it is apparent that some unfractured coal must remain, and thus the allowing heat to transfer comprises transferring heat substantially by conduction (that is, substantially within the unfractured portions).

With regards to claim 2435 and 5169; the Tsai reference does not teach the thermal conductivity; however, it would have been further obvious to one of ordinary skill in the art at the time of the invention to have practiced the Tsai method in a coal seam having a thermal conductivity of greater than about 0.5W/(m°C) as called for in claim 2435 and 5169; such a formation would be a desirable choice because it would heat more uniformly.

With regards to claims 2436-2438, 2442-2447, 5171, 5172, and 5176-5180; the nature of hydrocarbons produced from such heating is highly variable, and dependent upon many factors, not least of which is the characteristics of the coal. The components of the produced mixture are deemed to be the results of design variables, including coal characteristics and temperature.

With regards to claims 2457 ,2458,5191,5192, and 5204; the Tsai reference teaches the permeability greater than about 100 md in table 1. The uniform increase in permeability is inherent.

With regards to claim 2460, 5194; the Van Meurs reference teaches the heat sources surrounding the production well; since this includes at least 3 sources this inherently includes a triangle. It would have been further obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included at least 3 sources in a triangle as called for in claim 2460, in order to increase production.

With regards to claim 5150, 5155, 5197; the “selected section” is inherent.

With regards to claims 5151, 5152, 5156, 5157, 5198, and 5199; the “pyrolysis zone” is inherent.

With regards to claim 5153, 5158, and 5200; the open wellbore is inherent in the Tsai method (if the well was not open, the air would not flow into the coal as disclosed).

2. Claim 2431, 5165, and 5203 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai and Van Meurs as applied to claims 2424, 5154, and 5196 above, and further in view of Elkins (U.S. Patent number 2,734,579).

The Tsai and Van Meurs references fail to teach the controlling the temperature and pressure wherein the temperature is controlled as a function of the pressure or the pressure is controlled as a function of the temperature.

Elkins teaches controlling the pressure in order to lower the temperature (col. 3, line 46); this is done in order to help prevent overheating. It would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai process to have included the temperature is controlled as a function of the

pressure or the pressure is controlled as a function of the temperature as called for in claims 2431, 5165, and 5203, and as taught by Elkins, in order to prevent overheating.

3. Claim 2461 and 5195 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. and Van Meurs, et al. as applied to claims 2424 and 5154 above, and further in view of Salomonsson (U.S. Patent number 2,914,309).

The Van Meurs and Tsai references fail to explicitly teach the unit of heat sources in a triangular pattern and the plurality of units in a repetitive pattern. It is noted that the Van Meurs reference teaches the heat sources surrounding the production well, which would inherently include a triangular pattern.

Salomonsson teaches that it is desirable to have a repetitive pattern in order to cover the area evenly. It is apparent that this is beneficial in order to prevent hot spots.

It would have been further obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included a unit of a triangular pattern and a repetitive pattern of units as called for in claims 2461 and 5195; in order to cover the area evenly.

4. Claims 2448, 2449, 5182, and 5183 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai, et al. and Van Meurs, et al. as applied to claim 2424 and 5154 above, and further in view of Stoddard, et al. (U.S. Patent number 4,463,807).

The Tsai and Van Meurs references fail to explicitly teach the ammonia.

It is well known that ammonia is a byproduct of such heating of coal. This is taught by Stoddart. It is readily apparent that the amount of ammonia is dependent on

many design factors, including the formation characteristics (hydrocarbon content, etc.). It would have been obvious to one of ordinary skill in the art at the time of the invention to have practiced the Tsai method, as modified, in a formation with characteristics allowing greater than 0.05% of the produced mixture to be ammonia, as called for in claim 2448 and 5182.

With regards to claim 2449 and 5183; it is well known that one of the chief uses for ammonia is fertilizer; thus it would have been further obvious to one of ordinary skill in the art at the time of the invention to have used ammonia produced from the coal seam for fertilizer as called for in claim 2449 and 5183.

5. Claims 2430, 5164, and 5201 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai and Van Meurs as applied to claims 2424, 5154, and 5196 above, and further in view of Terry (U.S. Patent number 3,952,802).

The Tsai reference teaches combustion of the coal following the hot air treatment, but fails to teach the method of ignition or any details of the combustion system, and thus fails to teach the natural distributed combustor.

Terry teaches a method of in-situ combustion of coal, using a natural distributed combustor. The Terry method is advantageous because the granular material used to initiate combustion acts as a proppant, preventing reduced permeability (col. 4, line 22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have further modified the Tsai method to have included a natural distributed combustor, as called for in claims 2430, 5164, and 5201, and as shown by Terry, in order to initiate combustion and prevent reduced permeability. Note that the amended

claims require only a minimum of one natural distributed combustor; (a natural distributed combustor inherently includes a production well) a single combustor could easily be incorporated in a formation pre-treated (by the Tsai method) with a number of hot-air injectors (a natural distributed combustor inherently includes a production well).

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

1. Claims 2439-2441, and 5173-5175 have been identified as including subject matter which is allowable over the prior art, but are subject to double patenting rejections.

2. Claims 2439-2441, and 5173-5175 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over copending Application Nos. 09/840,937; 09/841,170; 09/841,288; 09/841,291; 09/841,300; 09/841,432; 09/841,438; 09/841,445; 09/841,495; 09/841,638; and 09/841,639; in view of Terry (U.S. Patent number 3,924,680) and "Coalbed Methane:

Principles and Practice". Although the conflicting claims are not identical, they are not patentably distinct from each other because the differences are obvious. Each of these copending applications has at least one claim which generally corresponds to a claim in the instant application. A table listing the applications and the claims in the instant application which correspond is shown below:

Copending application	Corresponding claims
09/841,300	2440,5174
09/841,438	2441,5175
09/841,495	2441,5175
09/841,639	2439,5173

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

#### ***Allowable Subject Matter***

Claims 2432, and 5166 are objected to as being dependent upon a rejected base claim, but would be allowable over the prior art if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicant is reminded that double patenting rejections may be applicable to these claims.

The previously indicated allowability of claims 2430, 5164, and 5201 has been withdrawn in light of the amendment filed 4/7/03, which broadened these claims.

***R spons to Argum nts***

Applicant's arguments filed 4/7/03 have been fully considered but they are not persuasive.

Applicant has argued that the proposed combination of Tsai and Van Meurs would render the Tsai invention unsuitable for its intended purpose. This is not persuasive because the Van Meurs reference is cited for its teaching that a large number of heater wells is well known in the art, and that more heating wells will increase production rates. One of ordinary skill in the art would have understood that increasing the number of heaters would result in an increase in production rates regardless of whether the heater wells are cased or open.

With regards to claims 2433, 5167, 5205; applicant has asserted that "Tsai and Kasevich do not appear to teach or suggest *using a desired heating rate to calculate a maximum average heating energy/day...*" [emphasis added] This step of "using" is not claimed. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With regards to claims 2435 and 5169; see figure 5 on page 275 of "Fuel a journal of Fuel Science" (applicant's citation A255) which clearly shows increasing thermal conductivity with temperature.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Kreck whose telephone number is (703)308-2725. The examiner can normally be reached on M-F 6:00 am - 3:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Heather Shackelford can be reached on (703)308-2978. The fax phone numbers for the organization where this application or proceeding is assigned are (703)305-3597 for regular communications and (703)305-7687 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)306-4177.



John Kreck  
Examiner  
Art Unit 3673

JJK  
June 6, 2003